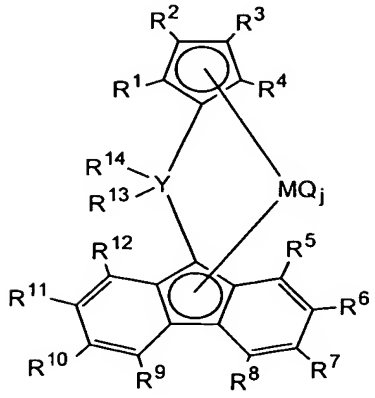
CLAIMS

1. A bridged metallocene compound represented by the formula [I]:



...[I]

wherein Y is a carbon, silicon, germanium or tin atom; M is Ti, Zr or Hf; R^1 to R^{12}, which may be the same or different, are each hydrogen, a hydrocarbon group or a silicon-containing group; neighboring substituents of R^5 to R^{12} may be linked with each other to form a ring; R^{13} and R^{14}, which may be the same or different, are each a hydrocarbon group or a silicon-containing group and may be linked with each other to form a ring (when R^5 to R^{12} are all hydrogen or when R^6 and R^{11} are both hydrocarbon groups, R^{13} and R^{14} are hydrocarbon groups other than phenyl, methyl and cyclohexylidene groups, and when R^7 and R^{10} are both hydrocarbon groups, R^{13} and R^{14} are hydrocarbon groups other than phenyl and methyl groups); Q is a halogen, a hydrocarbon group, an anionic ligand or a neutral ligand capable of coordination by a lone pair of electrons, and may

be the same or different when plural; and j is an integer from 1 to 4.

2. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein R^{13} and R^{14} are unsubstituted or substituted aryl groups, at least one of which is a substituted aryl group, and M is Ti or Zr.

3. The bridged metallocene compound of the formula [I] as claimed in claim 2, wherein R^{13} or R^{14} is a substituted aryl group which has one or more substituents of the same or different kind selected from hydrocarbon groups of 1 to 20 carbon atoms, halogen-containing hydrocarbon groups, halogen atoms, oxygen-containing groups and nitrogen-containing groups.

4. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein either or both of R^{13} and R^{14} is represented by $R^{15}R^{16}CH$-, in which R^{15} and R^{16} are each hydrogen, a hydrocarbon group or a silicon-containing group.

5. The bridged metallocene compound of the formula [I] as claimed in claim 4, wherein either or both of R^{13} and R^{14} is represented by $R^{15}R^{16}CH$-, in which R^{15} and R^{16} are linked

with each other to form a ring.

6. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein Y is a carbon atom; R^{13} and R^{14} are linked with each other to form a cycloalkylidene group represented by $-CH_2(CH_2)_n-$, in which n is an integer from 1 to 10; and R^7 and R^{10} are hydrocarbon groups of 1 to 20 carbon atoms.

7. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein arbitrary three or more substituents of R^5 to R^{12} are hydrocarbon groups of 1 to 20 carbon atoms or silicon-containing groups.

8. The bridged metallocene compound of the formula [I] as claimed in claim 7, wherein R^6, R^7, R^{10} and R^{11} are hydrocarbon groups of 1 to 20 carbon atoms or silicon-containing groups.

9. The bridged metallocene compound of the formula [I] as claimed in claim 7, wherein R^6 and R^7, and R^{10} and R^{11} are linked with each other to form rings.

10. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein R^5 to R^{12} are not hydrogen

at the same time; R^6 and R^{11} are not t-butyl groups when R^{13} and R^{14} are methyl or phenyl groups; and Y is a silicon, germanium or tin atom.

11. The bridged metallocene compound of the formula [I] as claimed in claim 10, wherein Y is a silicon or germanium atom.

12. The bridged metallocene compound of the formula [I] as claimed in claim 1, wherein R^1 to R^4 are all hydrogen.

13. An olefin polymerization catalyst comprising the bridged metallocene compound of claim 1.

14. An olefin polymerization catalyst comprising:

(A) the bridged metallocene compound of any one of claims 1 to 12 and

(B) at least one compound selected from:

(B-1) an organometallic compound,

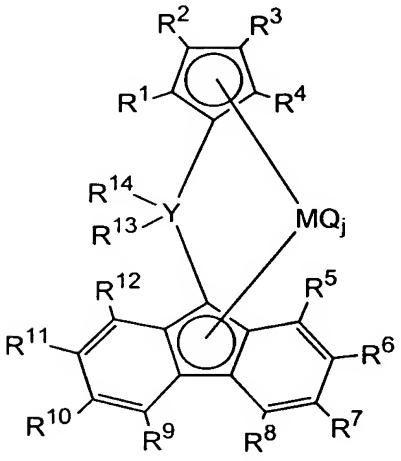
(B-2) an organoaluminum oxy-compound and

(B-3) a compound which reacts with the metallocene compound (A) to form an ion pair.

15. A method for olefin polymerization, in which one

or more monomers, essentially ethylene, selected from ethylene and α-olefins are polymerized in the presence of the olefin polymerization catalyst of claim 14 so that an ethylene based polymer with an ethylene content of more than 50 mol% is obtained.

16. A method for olefin polymerization, in which one or more monomers, essentially ethylene, selected from ethylene and α-olefins are polymerized in the presence of an olefin polymerization catalyst which comprises a bridged metallocene compound of the formula [I'] so that an ethylene based polymer with an ethylene content of more than 50 mol% is obtained:



...[I']

wherein Y is a carbon, silicon, germanium or tin atom; M is Ti, Zr or Hf; R^1 to R^{12}, which may be the same or different, are each hydrogen, a hydrocarbon group or a silicon-containing group; R^5 to R^{12} are not hydrogen at the same time; neighboring

substituents of R^5 to R^{12} may be linked with each other to form a ring; R^{13} and R^{14}, which may be the same or different, are each a hydrocarbon group or a silicon-containing group and may be linked with each other to form a ring; Q is a halogen, a hydrocarbon group, an anionic ligand or a neutral ligand capable of coordination by a lone pair of electrons, and may be the same or different when plural; and j is an integer from 1 to 4.

17. The method for olefin polymerization as claimed in claim 15 or 16, wherein the metallocene compound of the formula [I] or [I'] has been supported on a carrier.